

REMARKS

In response to the Office Action mailed October 14, 2008, Applicant respectfully requests reconsideration. To further the prosecution of this application, each of the rejections set forth in the Office Action has been carefully considered and is addressed below. The claims as presented are believed to be in condition for allowance.

Claims 2-4, 6-10, 12-14 and 16-20 were previously pending in this application. No claims are amended, added or canceled. As a result, claims 2-4, 6-10, 12-14 and 16-20 remain pending for examination, with claims 2 and 12 being independent. No new matter has been added.

Claim Rejections Under 35 U.S.C. §103

Independent claim 2 stands rejected under 35 U.S.C. §103(a) as purportedly being obvious over U.S. Patent No. 5,614,687 to Yamada et al. ("Yamada") in view of U.S. Patent No. 6,518,492 to Herberger et al. ("Herberger"). Independent claim 12 stands rejected under 35 U.S.C. §103(a) as purportedly being obvious over Yamada in view of Herberger and further in view of U.S. Patent No. 6,140,565 to Yamauchi et al. ("Yamauchi").

Each of claims 2 and 12 includes limitations directed to detecting positions of peaks of change in level of an input sound signal, accumulating a frequency of occurrence of each time interval between the positions of peaks detected in a plurality of unit-time intervals, and identifying a tempo of sound to be reproduced with the sound signal on a basis of a maximum one among all the accumulated frequencies of time interval occurrence. In Applicant's previous response filed June 23, 2008, it was pointed out that Yamada, Herberger and Yamauchi fail to satisfy these limitations.

The Office Action includes a "Response to Arguments" section which indicates disagreement on this point. Specifically, the Office Action contends that these limitations are satisfied by passages of Herberger which disclose a technique whereby (1) time differences between successive beats (i.e., inter-beat intervals) are determined (col. 7, lines 7-11) and (2) a histogram (shown in FIG. 1) depicting the occurrences of various inter-beat intervals is formed (col. 8, lines 8-

11). The Office Action thus appears to equate the frequency of occurrence of time intervals between beats, as taught by Herberger, and the frequency of occurrence of time intervals between peaks of change in level of an input sound signal, as recited by each of claims 2 and 12. This evidences a misappreciation for the claimed embodiments.

As Applicant's specification discloses, one conventional technique for determining the tempo of sound involves (1) acquiring audio data in a musical composition as time-series data, (2) calculating the autocorrelation of the audio data to detect peak positions in the audio data and acquire candidates for a tempo, and (3) analyzing the beat structure of the musical composition on the basis of the peak positions in the autocorrelation pattern and levels of the peaks to estimate the tempo of the musical composition (pp. 1-2). However, autocorrelation of audio data and analysis of beat structure involves numerous complicated computational operations (p. 2). As a result, many stereo systems (e.g., in-vehicle car stereo or home audio systems) are unsuitable for performing these operations, as the load on the central processing unit (CPU) is too great (p. 2). Accordingly, some embodiments of the invention provide a technique whereby the tempo of an input sound signal, such as a musical composition, may be determined simply and accurately without performing the autocorrelation of audio data and beat structure analysis that places such a large processing load on the stereo's CPU (p. 3).

Herberger discloses nothing more than what Applicant admits is conventional. Herberger discloses a technique for automatically determining the tempo (beats per minute, or BPM) of a musical work (Abstract). Herberger discloses that the "problem" of automatically detecting BPM may be divided into three sub-problems, the first of which is the identification of individual beats in the music (col. 5, lines 41-45). The second and third sub-problems involve determining a "characteristic time interval" between successive beats (i.e., determining BPM candidates for the musical work), and selecting from among the BPM candidates that which best represents the tempo of the work, respectively (col. 5, lines 46-51). Thus, Herberger's tempo estimation technique requires the type of CPU-intensive beat structure analysis described in Applicant's specification. In a passage cited by the Office Action, Herberger discloses that one way to perform beat structure analysis is to do an "envelope analysis" whereby beats are identified by detecting peaks in an envelope of approximately 20,000 or so re-sampled digital values representing about 50 seconds of

a musical work (col. 6, lines 22-30). The histogram shown in FIG. 1 of Herberger depicts intervals between beats determined using this beat structure analysis (col. 7, lines 49-57).

By contrast, each of claims 2 and 12 requires identifying tempo by accumulating a frequency of occurrence of each interval between peaks of change in level of an input sound signal. Thus, no beat structure analysis need be performed to identify the tempo of an input sound signal. Herberger says nothing about accumulating a frequency of occurrence of each interval between positions of peaks of change in level of an input sound signal, and the histogram shown in FIG. 1 depicts the frequency of occurrence of intervals between beats, not between peaks of change in an input sound signal. The fact that FIG. 1 depicts the frequency of occurrence of intervals between beats indicates that Herberger's technique requires the type of CPU-intensive beat structure analysis (i.e., so that the intervals between the beats may be identified and their frequency of occurrence charted) which Applicant discloses many types of devices are incapable of performing.

Accordingly, each of independent claims 2 and 12 patentably distinguishes over any combination of the asserted references, such that the rejection of each of claims 2 and 12, and of the claims that depend respectively therefrom, under 35 U.S.C. §103(a) as purportedly being obvious should be withdrawn.

CONCLUSION

A Notice of Allowance is respectfully requested. The Examiner is requested to call the undersigned at the telephone number listed below if this communication does not place the case in condition for allowance.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, the Director is hereby authorized to charge any deficiency or credit any overpayment in the fees filed, asserted to be filed or which should have been filed herewith to our Deposit Account No. 23/2825, under Docket No. S1459.70086US00.

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Respectfully submitted,

By Randy J. Pritzker

Randy J. Pritzker

Registration No.: 35,986

WOLF, GREENFIELD & SACKS, P.C.

Federal Reserve Plaza

600 Atlantic Avenue

Boston, Massachusetts 02210-2206

617.646.8000